UNITED STATES
DEPARTMENT OF
AGRICULTURE

FOREST
SERVICE

RO

PSW FOREST AND RANGE
EXPERIMENT STATION
MAY 10 1988
STATION LIBRARY COPY

REPLY TO: 3420

DATE: APR 08 1988

SUBJECT: Biological Evaluation of Salvage Marking Guidelines Used on 1987 Fires, Groveland and MiWok Ranger Districts (Report No. 88-7)

TO: Forest Supervisor, Stanislaus National Forest

At your request, members of Forest Pest Management (John Wenz, Entomologist; Gregg DeNitto, Pathologist), Timber Management-RO (John Fiske), and the University of California, Berkeley (John Helms) met with Forest and District personnel on March 30-April 1, 1988 to examine areas on the Groveland and MiWok Ranger Districts burned in September 1987. District timber marking crews began identifying trees for salvage soon after the fires were controlled. Visits to these marked areas this spring revealed that the crowns of many of the leave trees are fading. Closer examination of the trees by Forest and District personnel revealed extensive cambium kill at the base of trees in the absence of other indicators, such as crown and bole scorch and resin flow.

The purpose of the trip was to examine trees exhibiting this phenomenon, to determine the adequacy of the marking guides being used (developed from Wagener's 1961 publication), to predict the likelihood of survival of affected trees, and to evaluate the future course of insect activity in association with these trees.

Based on the examination of a number of trees, primarily ponderosa pine, the observations of Stanislaus NF personnel appear to be valid. The trees examined had little or no crown scorch and varying degrees of bole scorch, ranging in height from 2-3 inches to about five feet above the soil. Almost invariably, these trees, even those with only a few inches of bole scorch, had extensive dead cambium, typically occupying 60% to 70%-plus of the tree circumference. Dead cambium could only be determined by removing the bark at the soil line. With the onset of the growing season, the crowns of such trees are starting to fade and they can be expected to die. However, based on the visible condition of the trees at the time of marking, under "normal" burn conditions the trees would have been expected to live. Examination of meteorological and fire attributes suggest that this fire complex was not typical and may have burned much hotter than otherwise expected. It appears that the criteria used in the marking guidelines are valid, but the delay in expression of crown fade, coupled with the logistical need to begin marking as soon as possible, resulted in a conservative marking causing an underestimate of the salvage volume. Marking crews are now examining more trees on each site to determine cambium kill and to estimate fire intensity. With this information they can more accurately estimate the likelihood of tree survival and hopefully reduce the need to re-enter areas already marked.

Virtually no evidence of bark beetle, wood borer or related insect activity was observed in the trees examined. As trees continue to decline and die this spring, they will be very susceptible to attack by wood borers, horntails and ambrosia beetles resulting in subsequent degrade. Living, fire-weakened trees normally remain susceptible to attack by bark beetles for 1 to 2 years following the burn. Trees uninjured by the fire and/or healthy trees in the surrounding forest are infrequently attacked as a consequence of the concentration of insect attacks in fire-injured trees.

This situation is complicated by four years of below normal precipitation. The resulting moisture stress has weakened trees throughout the forest as well as adding further stress to fire-injured trees making both increasingly susceptible to insect attack. The observed and expected future increase in bark beetle-related mortality in non-burned areas is thus primarily attributable to moisture stress and resident beetle populations and not a build-up of beetles in the burned areas. A possible exception is where fire-damaged trees are adjacent to undamaged trees, such as along the edge of the burns or on the edges of islands of green trees within the burns. Group tree killing may occur in these specific locations.

The situation encountered by the marking crews following the September 1987 burns on the Stanislaus NF, i.e., extensive basal cambium kill with minimal bark scorch and delayed crown fade, is not typical of past burns or at least not widely reported in the literature. Therefore, it would be beneficial for the Forest to formally document their experience.

JOHN NEISESS
FPM Program Leader
State and Private Forestry

FOREST PEST MANAGEMENT
Pacific Southwest Region